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ANNUAL MEETING - JUNE 1965

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Meeting of Canadian and U.S. ICNAF Scientists

Woods Hole, Massachusetts

1-3 December, 1964

Chairman: H.W.Graham (U.S.A.)
Rapporteur: J.L.Hart (Canada)

Other Participants:

Canada: F.W.H.Beamish, N.F.Bourne, A.M.Fleming, A.C.Kohler, and F.D.McCracken

ICNAF: L.R.Day, Executive Secretary

U.S.A.: B.E.Brown, R.L.Edwards, M.D.Grosslein, E.B.Haynes, R.C.Hennemuth,
A.C.Jensen, G.F.Kelly, F.E.Nichy, J.A.Posgay, J.B.Skerry, and
R.L.Wigley

General

The first half day was devoted to general topics; L.R.Day reviewed ICNAF objectives, accomplishments, and work during the past few years. He reported particularly on the scientific achievements of the Commission, and announced that the first number of the Research Bulletin is now published and available.

J.L.Hart reviewed the current research program of the St. Andrews laboratory of the Fisheries Research Board of Canada; indicating its broad scope and pointing out its position relative to the other stations of the Fisheries Research Board.

H.W.Graham reported on the research of the Woods Hole laboratory of the U.S. Bureau of Commercial Fisheries, and the recent reorganization of the Laboratory Program. As part of the morning's program, the visiting scientists were given an opportunity to inspect the *Albatross IV*.

A.M.Fleming commented briefly on the work of the St.John's station of the Fisheries Research Board, and then presented a report on the status of the various cod stocks in Subareas 2 and 3. He pointed out that catch per unit effort of in-shore fisheries (line, gill net, and trap) has dropped following increases in effort and intensive exploitation by mobile fleets fishing offshore. There were significant reductions in average length of fish in catches associated with the drops in catch per effort.

R.L.Wigley reported on geological evidence of the presence of an island in the present location of Georges Bank some 11,000 years ago. This evidence consisted of *Zirfaea* shells and peat, brought up in substantial quantities by a scallop dragger, which was carbon dated. This showed that the peat was long established on the bottom. The hypothesis is supported by silt deposits and dating of fossil oyster shells.

Exemptions to Trawl Regulations

The group considered a proposal made by Canada at the 14th Annual Meeting regarding exemptions to the trawl regulations (14 Ann.Meet.Proc.3, para.9; Proc.3, App.I, para 4; Proc.6, para.9; Proc.15, para.10; Proc.15, App.II, para.5).

Canada presented tabulations of the way in which various applications of annual exemptions would have worked during 1962 and 1963 in Subarea 3 and 4; and the U.S. presented an analysis of the operation of annual and trip exemptions in the U.S. fleet. It was pointed out that both Canada and the U.S. intend to submit meeting documents on this subject at the next Annual Meeting of ICNAF.

In discussing the problem of inclusive versus individual species exempted, and with particular reference to the report of the ad hoc Committee on Trawl Regulations (Proc.15, para.10), the point was made that the purpose of exemptions to mesh regulations is to prevent the waste of small-sized, regulated species taken with unregulated gear in legitimate fishing for unregulated species; and that exemptions should be permitted so long as the total quantity of regulated species so taken does not adversely affect the conservation effort. Furthermore, exemptions should be allowed only with the proviso that countries concerned prepare special reports annually on the quantity and sizes of regulated species taken by exempted gear.

In respect to the argument that under present regulations the increasing number of species regulated would result in an increasing proportion of individual landings exempted, it was pointed out that this situation is not relevant to the conservation of the individual species. The critical statistic is the proportion of the total catch of a given species taken with unregulated gear to the total (biomass), rather than the proportion of regulated to unregulated species in individual trips.

Sea Scallops

Canada reported on the recent history of the Canadian fishery; pointing out that total catches from Georges Bank have increased due to increased effort accompanied by extending the areas fished. Stock abundance has decreased as shown by lowered catch per day's fishing and lowered size of cull. The Canadian fleet has also taken sea scallops during the past year from such other areas as Browns Bank, St. Pierre Bank, and the Gulf of St. Lawrence.

Canada conducted abundance studies on Georges Bank from a research vessel, but these data have not yet been fully analyzed.

The U.S. reported that total (Canada plus U.S.) landings from Georges Bank have declined slightly during the last two years. Abundance has declined since 1960, as evidenced by catch per day on the grounds of the U.S. fleet, and by research vessel studies. The U.S. has conducted abundance surveys of sea scallops on Georges Bank since 1960. These show that the abundance index¹ has declined from 160 to 60 on the northeast part of the Bank, and from 75 to 20 on the southwest part. This was associated with the decline of a dominant year class recruited in 1959, but abundance does not appear yet to have decreased to the pre-1959 level.

The U.S. has conducted growth rate studies on smaller sizes of scallops such as those found on navigation buoys. The growth curve for these sizes fits in well with the curve obtained from the study of the commercial sizes; thus completing our knowledge of the growth pattern through life, and providing an estimate of absolute age in relation to rings on the shell.

The U.S. has studied mortality rates by several methods. These indicate a total annual instantaneous mortality rate of about 0.8. Natural mortality was indicated at about 0.08; leaving a fishing mortality of about 0.7.

Yield isopleths computed on the basis of the estimated growth and mortality rates show a possible 25 percent increase in sustained yield-per-recruit by delaying average age of earliest cutting by 3-1/2 years. They also show that the optimum fishing effort is being exceeded with present size selectivity; that halving the fishing effort would increase yield by 5 percent, and doubling fishing effort would reduce yield by 10 percent.

Since the above studies substantiate previous conclusions that delaying capture would result in increased sustained yields, the group discussed various ways in which this might be effected. Earlier experiments by Canada had shown that increasing ring size is not effective in doing this.

The U.S. raised the question of delaying age of capture by regulating the size of scallop used. In this connection they presented data related to enforcement of a size regulation based on the size of scallop meats. Their analysis

¹Number of scallops larger than 70 mm shell height per 10,000 square feet dredged

included a regression line showing the relation of shell height to meat weight along with the variation in this relationship. The variation was analyzed in relation to sex, season, and grounds. There was no significant difference in the sexes, and the area differences were less than that between samples. Seasonal differences could, however, be detected. There is a precise relation between meat weight and shell length, but the practical problems of applying this to regulation need further investigation.

Canada has conducted further experiments with scallop gear with the hope of finding a method which lends itself to avoiding capture of small scallops. Trials with calico scallop nets and tumbler gear showed them to be relatively inefficient, and to have no special advantages. Further work on scallop gear will be directed toward increasing efficiency.

Canada reported on exploratory work conducted in the Browns Bank-Lurcher Shoal area, and the Gulf of St. Lawrence. Studies have been conducted related to increasing utilization of the scallop resource by using the gonads as well as the adductor muscle. Canada is continuing spawning and larval studies. No complete metamorphosis of larvae has been obtained, although the larvae have been held alive for over 6 weeks.

The U.S. reported on food studies. Stomach contents show that scallops ingest a large variety of plankton and detritus including copepod nauplii, but feeding experiments indicated that concentrations of larger *Artemia* inhibit feeding.

Techniques of Groundfish Surveys

Canada reported on studies of fatigue in haddock and the possible effects on tagging experiments. Canadians also reported on swimming endurance in redfish, plans for studying sound perception in cod, observations on activity in relation to light, and modification of otter trawls for off bottom fishing. Records from echo sounder tracings and fishing observations were used in studying the vertical diurnal movements of cod, haddock, pollock, redfish, and flatfishes.

Canada described results of a method of groundfish surveys which correlates trawl fishing results with echo soundings. Results of these surveys showed cod distributions were related to annual migration patterns.

Canada announced an increasingly active program of using echo sounding equipment for the study of the distribution and abundance of fish.

The U.S. reviewed the history of its groundfish survey program which was initiated at Woods Hole in 1948. The program was not a comprehensive one until the acquisition of the *Albatross IV* 2 years ago. The program now calls for three surveys per year for a 3 year period; covering the area from Nova Scotia to Hudson Canyon.

The main objective of the survey concerns groundfish, but invertebrates and bottom sediments are sampled as well. The surveys have been successful as a basis for forecasting abundance of haddock, and confidence in the forecasts has increased as methods have been refined. Considerable attention is being given to increasing the efficiency of the surveys. Past concepts of sampling have been reviewed and new patterns of sampling, based on stratification by depth and area, have been developed. In this connection one cruise has been made to develop techniques further, and another is planned for January.

Silver Hake

The U.S. reported initiating studies on the validity of otolith age determinations, while Canada reported starting a program of sampling and age determinations for this species.

The U.S. presented data on abundance of silver hake stocks which showed no decline from 1960 to 1964 in catch per day of the U.S. fleet. An analysis of length compositions of commercial and research vessel samples was presented. Most groups of samples showed bimodal distributions, and variable proportions of size groups through the years, but the significance of these is still uncertain lacking the age compositions.

Silver Hake Otolith Exchange

The U.S., which was designated coordinator at the last Annual Meeting, reported that plans for Subarea 5 otolith exchange and reading were circulated to Canada and the U.S.S.R. At the suggestion of Canada the plan was modified to include otoliths from Subarea 4. Subsequently, otoliths with preliminary age determinations were supplied to Canada and the U.S.S.R. to the designated personnel. Otoliths have been received from Canada.

Mesh Selection

The U.S. reported on mesh selection experiments conducted on silver hake. These were carried out on the research vessel *Delaware*, and on commercial vessels from two ports.

These experiments demonstrated that the paired haul tows provided quite different selectivity curves than covered nets, and were thought more valid. The recent experiments provided rather good data on selection curves.

In the experiments on commercial vessels, a 71 mm mesh nylon net was compared with a 53 mm mesh net in Gloucester; and with a 127 mm mesh net with 33 mm net liner in Pt. Judith. The results of these experiments showed that the 53 mm net gives a selection close to the cull curve for the silver hake food fishery. However, in the Gloucester experiment, the 71 mm net caught about 47 percent less than the commercially used 53 mm net. At Pt. Judith, where a 33 mm nylon liner is employed, the catch (which here is equivalent to the landings) was reduced by about 52 percent. The initial loss in the Pt. Judith experiments would have been greater had the smaller sizes been more abundant since all sizes are retained by this fishery. The U.S. is preparing a report on these experiments which will be submitted to the Commission later.

Cooperative Haddock Studies

Canada and the United States are continuing their 4X haddock studies; the first report appears in No.1 of the ICNAF Research Bulletin. Canada presented an analysis of detailed location of Canadian fishing effort in Subarea 5; which effort has increased substantially in the last 2 years. The U.S. expressed interest in incorporating these data into their abundance studies of Georges Bank haddock. It was agreed that the cooperative coverage was adequate and should be continued.

The U.S. offered to make available to Canada a collection of haddock scales from 4V, W, and X for the years 1930 to the 1940's, and Canada expressed interest in studying the scales from 4W. It was agreed that Canada would send a technician to Woods Hole to study U.S. techniques of haddock scale reading, and that the U.S. would provide Canada with the collection for study.

The U.S. expressed interest in obtaining detailed effort data from the log books of the Canadian fleet operating in the southern part of the ICNAF area. Canada agreed to make such data available in the form of punch cards with coded information, should the U.S. request this with regard to a specific study.

The U.S. reported that the time-depth-recorder (TDR), designed to record number, depth, and length of tow on fishing vessels, had reached the prototype stage and that, if tests now under way prove useful, it is expected that the instrument will be in commercial production next year.